Apostle Islands National Lakeshore

2004 - 2005

Monitoring, Research, and Restoration Report

Devil's Island Sandstone

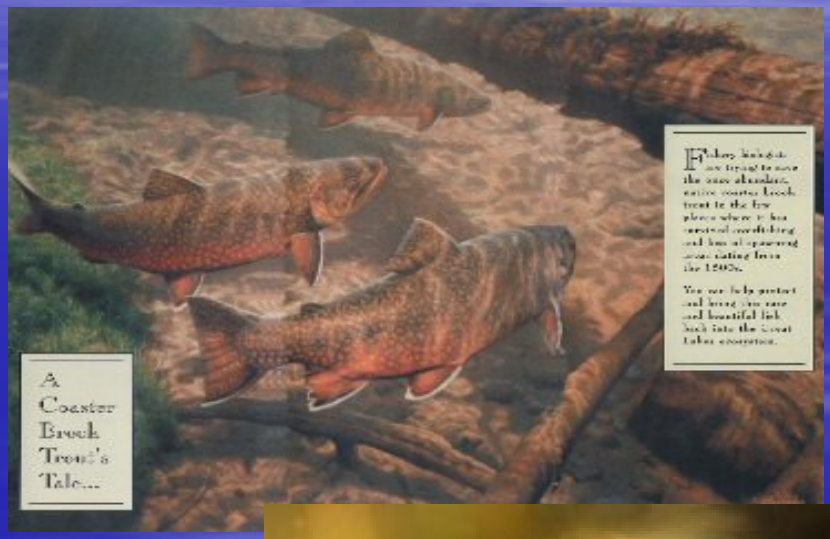
- Devils Island and Hinckley sandstones were thought to have been deposited in a near-shore lake environment.
- This study will try to determine if they were actually deposited by wind and stream action.

Water Quality

- Mercury levels were tested in fish and water at Outer and Stockton lagoons – levels were very high.
- Monitoring finds Lake Superior water quality to be very good and lagoons heavily influenced by Lake Superior and adjacent wetlands.

Fish

- Sampling for coaster brook trout was done by U.S, Fish & Wildlife Service in four streams on Oak Island – brook trout were found in 3 of them.
- Inventory of nearshore fish community was done by USGS-Biological Survey; the nearshore community was found to be similar to Isle Royale but distinct from the offshore fish community; 25 species were identified.



Climate Change Peatlands Project

- Wisconsin DNR surveys completed to obtain baseline information for future comparisons.
- A species of rare dragonfly, predacious diving beetles, and plants were found.

Rattlesnake plantain

Cingilia cacoon

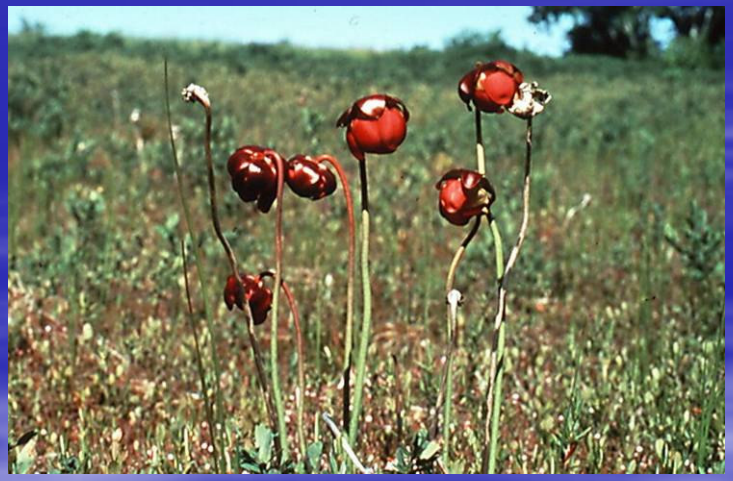
Rare Plant Monitoring

- Goal – monitor status of Special Concern, Threatened, and Endangered plant populations.
- Devil's Island:
  - 2004 - 513 butterwort plants, and 692 arctic primrose
  - 2005 – 236 butterwort plants, and 2,258 arctic primrose.
- Populations appear stable.

Arctic Primrose

Pitcher Plants

- Study completed looking at the dispersal of wetland plants and their patterns of colonization on isolated islands and adjacent mainland systems throughout the Lake Superior Watershed.
- Data suggests moderate genetic diversity and that populations of pitcher plants across large distances are relatively similar.
- In terms of restoration, this may mean that individuals from any established population can be used to restore an extirpated population.



Vegetation Mapping, Inventory and Monitoring

- 104 vegetation plots were sampled in 2005 to help create a vegetation map for the park.
- Vegetation plots were sampled that can be compared with data collected 50 years ago.
- Two vegetation sampling methods were compared.

Sandscapes

- The park has rare, high quality sandscapes with vegetation sensitive to trampling.
- 2004
  - Sandscapes at Bear, Oak, Long Island, Little Sand Bay and Sand River monitored.
  - Vegetative litter increased and vegetation cover decreased on all 5 sandscapes monitored.
  - Percent bare soil decreased on 3 of 5 sandscapes.
- 2005
  - Percent vegetation cover decreased on Cat and Michigan Island sandspits.

Bear Island Sandspit

Campsite Monitoring

- A total of 65 campsites in the Park.
- One-third are monitored every year to detect changes as a result of use.
- Limits of Acceptable Change (LAC)

  The size of impacted area which is defined as;
  - 250 m^2 for individual sites, or
  - 1,200 m^2 for group sites.
- Restoration is generally needed when a campsite size approaches or exceeds the LAC.
- Ten sites have exceeded the LAC according to 2002-2004 monitoring.

Exotic Plant Species

- Great Lakes Exotic Plant Management Team spent 187 hours in 2004, and 154 hours in 2005 in the park treating exotics.
- Species treated included orange hawkweed, Japanese knotweed, mullein, purple loosestrife, sheep sorrel and spotted knapweed.

Treating Purple Loosestrife
on Long Island

Hawkweed

- Exotic, invasive species that threatens sandscapes and cultural openings.
- Treatment is completed on Oak Island sandspit through hand-pulling.
- 2004 - 51 plants counted in a monitoring plot, none with flowers.

Purple Loosestrife

- Exotic, invasive species that threatens wetlands on Long Island.
- Two pronged approach to management:
  Long Island 'cut' – biological control,
  Long Island tip – chemical control.
- Long Island 'cut'
  Approximately 4,400 plants treated with herbicide.
- Long Island tip
  More intensive survey resulted in finding a very high number of plants – all were treated.

Exotic Species – Gypsy Moths

- Exotic, invasive species that threatens hardwood forests.
- Park cooperates with the U.S. Fish & Wildlife Service and Wisconsin Department of Agriculture.
- Highly significant increase in number of moths trapped over past 4 years ($P < 0.0000$).
- 2004 – 3,127 moths in traps.
- 2005 – 6,741 moths in traps.
- Infestations have potential for concentrations of dead trees in the future.

Breeding Bird Surveys

- 2004 – 1,047 birds; 72 species.
- 2005 – 1,162 birds; 77 species.
- Ovenbird and hermit thrush are showing significant increasing trends.
- Eight species showing decreasing regional trends are stable or increasing at the park and between 1995-2005 were among the most abundant 27 bird species on park surveys.
- Apostle Islands may play important regional role in providing habitat for ground nesting species.

Ovenbird

Colonial Bird Monitoring

- 30 years of monitoring herring gulls, double crested cormorants, and great blue herons throughout the park.
- Double-crested Cormorants -
  - Approximately 40% fewer cormorants on Gull Island in 2004 than in 1999.
- Gulls -
  - Approximately 50% fewer gulls on Eagle Island in 2004 than in 1999,
  - Total of 54.6% of colonies produced young.
- Herons -
  - Population appears stable.

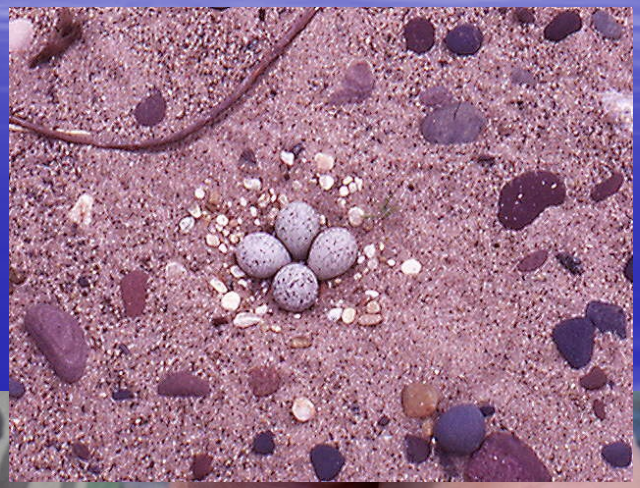
Gull Island eggs and chick 2004

Bald Eagles

- Threatened species.
- 2004 had the highest number of nests (13) and the highest number of chicks fledged (15) since 1980.
- 2005 had the second highest number of nests (10) and the third highest number of chicks fledged.
- Number of occupied nests in the archipelago has increased significantly ($P < 0.0001$) since 1980.
- Mean productivity between 1980 and 2005 is 0.8 young/active nest which is lower than regional productivity.

Piping Plover

- Endangered species.
- 2004 - Three birds observed; no nests established.
- 2005 – Three birds observed; one nest established; one chick of four fledged and banded.
- Population increasing overall in Great Lakes states.



Ruffed Grouse

- Monitored in cooperation with the State.
- Game species.
- 2004 - 11 birds.
- 2005 – 5 birds.
- No significant trend time.

American Woodcock

- Monitored in cooperation with the state.
- Game species.
- 2004 - 5 birds.
- 2005 – 11 birds.
- Significant decreasing population trend between 1989 and 2005 ($P<0.05$).

Bats

- Bat inventory conducted in 2003 and 2004 with funding from the Great Lakes I&M Network.
- The primary objectives were to:
  - document the occurrence of all bat species believed to be present within the park and establish a collection of catalogued voucher specimens;
  - determine the summer relative abundance of each species; and
  - locate and map important habitats including: feeding areas; day or seasonal roosts; maternity sites, and hibernacula.
- Four species of bats were captured, including little brown bat, northern Myotis, eastern red bat, and silver-haired bat.

Little brown bat

Small Mammals

- Seven of the 22 Apostle Islands, as well as Little Sand Bay on the mainland unit, were inventoried for small mammals during 2003 and 2004.
- Eight species were captured;
  - red-backed vole and red squirrels were the most abundant.
- No winter-inactive or winter hibernators were captured, suggesting that small mammals likely disperse to the Apostle Islands in the winter when the water is frozen.

Red-backed vole

- Distance to island coupled with island size seems to limit the poorer dispersers, such as North American deer mouse, from many of the islands in the archipelago.

White-tailed Deer

- Study completed to determine impacts of deer browse and population levels.
- Many of the park's islands have little or no evidence of deer presence and currently support a very unique plant community that has become exceedingly rare on the mainland.
- Deer have recently become established on Sand and York Islands, two islands without a known history of deer.
- Data collected to date indicate a high density and widespread deer population on Sand Island and a very high density deer population on York Island.

Canada yew on York Island

Black Bear

- In 2004, snares to collect hair for DNA analysis were established on islands that have had bear sightings or sign and were not sampled during the 2002 study.
- 2004 sampling was done to obtain data that will enable the park to better understand movements of bears between islands.
- Hair samples were obtained from Basswood, Manitou, Michigan, Outer and Raspberry.
- A park database was developed to track bear observations:
  - 2004 - 60 observations
  - 2005 – 8 observations.

Black bear on Stockton Island - Scar

Cabin Site Restoration

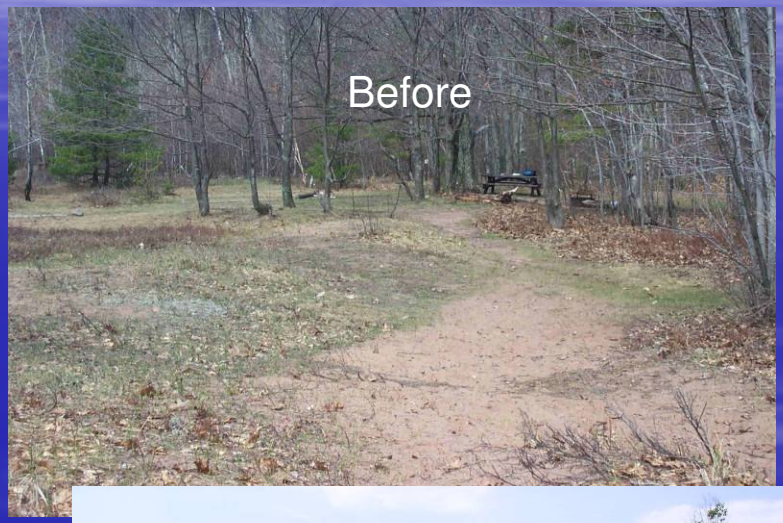
- Restoration conducted at previous cabin sites on Long, Otter, Rocky, Sand and South Twin Island and the Mainland.
- 2003 and 2004 – native trees transplanted.
- Survival rate high very high for red maple, red oak, white cedar, white pine, white spruce, and jack pine.
- 2004 - approximately 4,000 propagated native plants used in restoration.
- Survival rate very high for blueberry, hairgrass, Pennsylvania sedge, and raspberry.

Before – South Twin

After – South Twin

Oak Island Sandspit Restoration

- **Restoration initiated in 2000.**
- **Cooperative effort with NRCS and volunteers.**
- **Planted and non-planted natives out-competing exotic plants.**



After

South Twin and Raspberry Sandscape Restoration

- Cooperative effort with NRCS, FWS and volunteers.
- South Twin - over 3,600 native plants used in restoration.
- Raspberry – Over 850 native plants used in restoration.
- Percent survival was high for many species, especially blueberry, goldenrod, hairgrass, rush, and wild rose.

South Twin Island

Raspberry Island Slope Restoration

- Goal is to provide long-term stabilization of reconstructed slope in front of lighthouse.
- Cooperative project with the Natural Resource Conservation Service.
- Native shrubs and forbs planted in 2003 and 2004. Most planted species had a good to excellent survival rate.
- Many weedy species were brought in with topsoil.

Outer Island Slope

- Goal - to provide long-term stabilization of reconstructed slope in front of lighthouse.
- Cooperative project with the Natural Resource

  Conservation Service.
- 2004 – Rock revetment and drainage trenches installed.
- 2005 - Log cribs and slope grids installed, restoration using live stakes and approximately 3,900 plantings.